



## ROD-KNUCKLE™ ENVIRONMENTAL BOP STUFFING BOX

Through extensive research and comprehensive field testing, Nelgar Services Inc. has designed a patented **Rod-Knuckle™ Environmental BOP Stuffing Box**.

The **Rod-Knuckle™** features the following advantages over other major competitors’.

Features	Benefits
<b>Dual packing</b>	Superior environmental protection - the top (secondary) packing provides a positive seal when the bottom (primary) packing fails.
<b>Self-aligning knuckle</b>	Reduce side loading on top packing - the top packing rotates with the polished rod when a misalignment exists.
<b>Check valve</b>	Prevent costly blowouts – specially constructed for exceptional strength, the check valve closes in the event of a polished rod failure and provides a reliable shut-off.
<b>Optional pressure shut-down switch</b>	Early detection of bottom packing failure – utilize control chamber pressure resulting from a bottom (primary) packing failure.
<b>Optional lubrication systems</b>	Prolong packing life – self contained Knuckle Buddy and Swedge lubrication systems.
<b>Quick and easy maintenance (easiest in industry)</b>	Reduce expenses and save time – wearable parts can be easily replaced without lifting any components of the Rod-Knuckle™ over the polished rod.
<b>Low profile, light weight and rugged</b>	Build to last, easy to install and maintain. “NOT YOUR WEAK LINK”

The **Rod-Knuckle™ Environmental BOP Stuffing Box** is tested to 10,500 psi. It withstands 42,000 lbs top load without crushing the top and bottom packing. The check valves are specially constructed for exceptional strength. Its unique **knuckle** design allows the top (secondary) packing to rotate with the polished rod when a misalignment exists. The **Rod-Knuckle™** can also be utilized as an alignment tool. It is suitable for regular, sour and high temperature services.



The **Rod-Knuckle™** is a cost effective and durable wellhead accessory designed to protect and preserve the environment. Its operation is simple and reliable.

**SPECIFICATIONS**

Size polished rod: 1-1/2", 1-1/4"  
 flow tee connection: 2-3/8" EUE, 2-7/8" EUE, 3-1/2" EUE, 3" API line pipe  
 flange connection: (2-9/16"-5M-R27) (3-1/8"-3M-R31) (5 1/8"-3M-R41)

Pressure (psi) 3,000 (tested to 10,500 psi)  
 Top load (lbs) 42,000 maximum (without crushing top and bottom packing)  
 Operating Temperature (°F) -50 and up

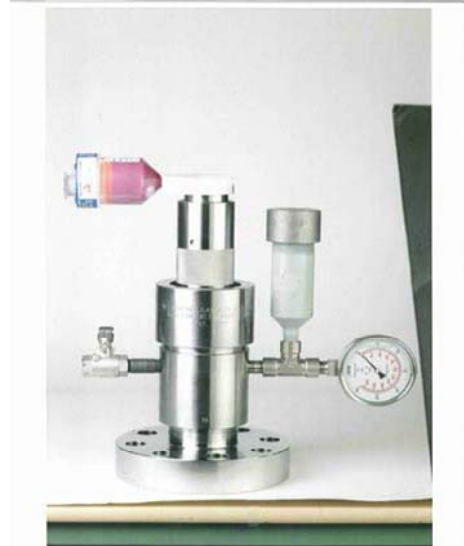
Dimensions 16.5"H x 5.5"OD  
 Weight 45 lbs

Material body 4140 HTSR steel (heat treated stress relief)  
 check valve regular services – Delrin® 511P NC010 acetal resin  
 sour services – Delrin® 511P NC010 acetal resin  
 high temperature services – 6061-T6 aluminum (solution heat treated and artificially aged)  
 sour high temperature services – PEEK™ polymer  
 brass rings ASTM B505-08  
 packing available for different services and applications

- \* Exceeded PSAC IRP Minimum Wellhead Requirements
- \*\* Passed ASTM A370 Standard Test for Mechanical Testing of Steel Products



Flow Tee Connection Model



Flange Connection Model

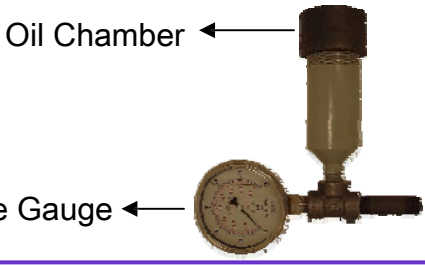
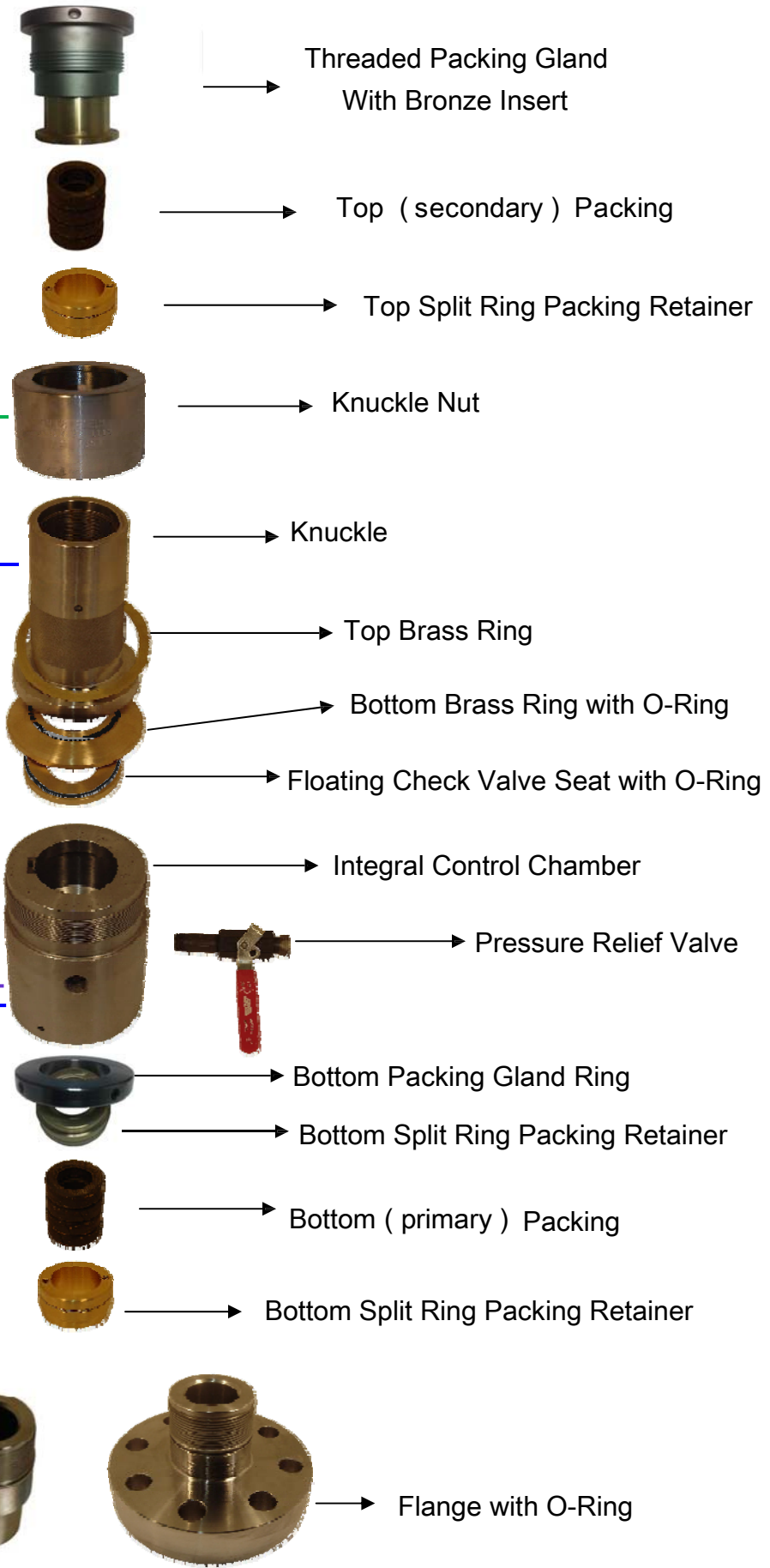


# Rod Knuckle™ Operation Diagram

Two places to use spanner wrench for access to the packing.

Two thumb screws must also be loosened for access to the packing. They must be re-tightened after each service. (finger-tight only)

Set-screw is used to secure knuckle



Flow Tee Adapter with O-Ring

Flange with O-Ring



### INDUSTRY AT A GLANCE

Feature	Nelgar Rod-Knuckle™	Red Wing Super B7	Opal HF	Dura PCCV	Hercules PCSB	Production Safety HT
Dual packing	√	√	√	√	√	X
Different packing required	X (same for both)	X	√ (2 different types)	√ (2 different types)	√ (3 different types)	N/A
Top load crushes packing	X	X	√	X	√	X
Rotating top packing and side loading relief	√	X	X	X	X	X
Integral BOP (check valve incorporated)	√ (1 piece)	√ (1 piece)	3 pieces (sold separately)	2 pieces (sold separately)	Add-on required (sold separately)	√ (1 piece)
Check valve causes damage to polished rod	X	√	√	√	√	√
Rated pressure (psi)	3,000	2,500	2,500	2,000	1,500	3,000
Testing pressure (psi)	10,500	5,000	4,000	4,000	N/A	N/A
Operating temperature (°F)	-50 and up	-40 and up	-15 and up	-15 and up	-15 and up	-40 and up
Pressure shut-down switch	√	√	X	√	X	X
Lubrication systems	√	X	X	X	X	X
Easy access to check valve and change parts	√	X	X	X	X	X
Height (in)	16.5	20.4	24.5	25	33	12
Weight (lbs)	45	85	70	65	112	45
Main body material	4140 HTSR** steel	4140 steel	ductile* steel	ductile* steel	ductile* iron	4140 steel

\* PSAC IRP 5.2.4 – Wellhead equipment manufactured from ductile iron is not suitable for use in western Canada when exposed to extremely low ambient temperatures.

\*\* HTSR - heat treated stress relief